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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/588,993

08/10/2006

Harue Nakashima

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4536

31780

7590

03/01/2010

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EXAMINER

NGUYEN, VU ANH

ART UNIT

PAPER NUMBER

1796

MAIL DATE

DELIVERY MODE

03/01/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/588,993	Applicant(s) NAKASHIMA ET AL.	
	Examiner Vu Nguyen	Art Unit 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-17 is/are allowed.
- 6) ☐ Claim(s) ____ is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>08/10/2006, 06/02/2009</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Status of Application

1. Claims 1-17 are pending in this application.

Specification

2. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

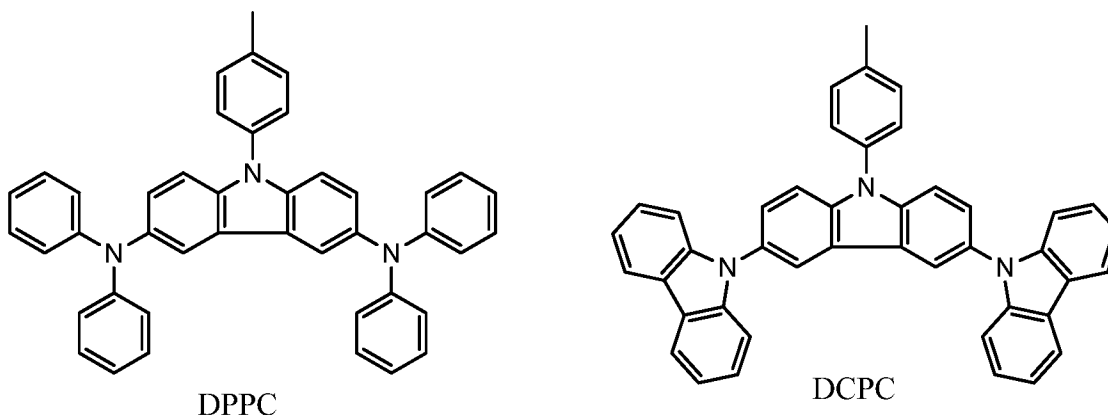
1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 1, 2, 4-8 and 10-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kido et al. (US 2005/0084712) in view of Zhang et al. (Synthetic Metals 137 (2003) 1111-1112).

6. Regarding the limitations set forth in these claims, Kido et al. (Kido, hereafter) discloses an organic light-emitting device having a general configuration of substrate/anode/hole-injecting layer/hole-transporting layer/light-emitting layer/electron-injecting layer/cathode (Figure 6), wherein the hole-injecting layer includes a mixed layer of a metal oxide and an organic compound (Abstract). The metal oxide includes vanadium oxide and rhenium oxide (claim 7). The organic compound includes those having an ionization potential less than 5.7 eV and exhibiting electron-donating (i.e., hole-transporting) property [0066]. Such compounds include N-phenylcarbazole [0072]. The nature of the mixed layer is such that it can play the role of a charge-generating layer: it can be an electron-injecting layer or hole-injecting layer, depending on its position relative to the light-emitting layer [0025]. The prior art clearly suggests embodiments where an LE device has two of such mixed layers disposed on both sides of a light-emitting layer. Further, the work function of the electrodes (anode and cathode) is not important [0026]. Thus, either a conventional design having ITO as anode and Al as cathode or the reverse of that is equally acceptable (paragraph [0027] and compare example 2 with example 3). Note that the metal oxide plays the role of an electron acceptor relative to the organic compound in the mixed layer [0067]. The device can be used as a planar light source or as a display device [0003].

7. Clearly, Kido teaches all the limitations set forth in these claims but fails to teach the claimed carbazole derivative.

8. Zhang et al. (Zhang, hereafter) discloses carbazole derivatives that are used as hole-transporting materials. The derivatives consist of the following two species:



[Motivations] These species (where DPPC, having an ionization potential of 4.94 eV, reads on the claimed carbazole derivative) are said to have good thermal stability and excellent electrochemical reversibility and hole-transporting properties (conclusion).

Further, when used as hole-transporting materials in organic light-emitting devices, the DPPC device has much better performance than DCPC one as DPPC provides better hole injection and transport properties (p. 1112, last sentence before conclusion).

9. In light of such benefits, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have employed the DPPC species taught by Zhang as the organic compound in the mixed layer in the LE element taught by Kido so that, due to enhanced hole injection and hole transport properties, the performance of the LE element can be improved.

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10. Claims 1-4, 7-10 and 13-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al. (US 2005/0116633) in view of Zhang et al. (Synthetic Metals 137 (2003) 1111-1112).

11. Regarding the limitations set forth in these claims, Yamazaki et al. (Yamazaki, hereafter) discloses a light emitting element comprising a plurality of layers sandwiched between an anode and a cathode (see Figures 1, 2 and 7), wherein the plurality of layers include a light-emitting layer. In one embodiment (Figure 7), the LE element has a configuration of substrate/anode/hole-injection layer/hole-transport layer/light-emitting layer/electron-transport layer/electron-injection layer/cathode. The hole-injection layer, in one embodiment, is made of a composite material of an organic hole-transporting material and an inorganic conductive compound such as molybdenum oxide [0065-0066]. The organic hole-transporting material includes a carbazole derivative such as TCTA [0066]. An electronic device comprising said LE element is also taught (Figures 3-5).

12. It is clear that Yamazaki discloses all the limitations set forth in these claims but fails to teach a layer made of a composite of molybdenum oxide and a carbazole derivative of claim 1.

13. In light of the teachings by Zhang as discussed in paragraph 8 above, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have employed the DPPC species taught by Zhang as the organic hole-transporting material in composite with molybdenum oxide in the LE element taught by Yamazaki so that, due to enhanced hole injection and hole transport properties, the

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performance of the LE element can be improved. It is noted that molybdenum oxide inherently serves as an electron acceptor to the DPPC.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vu Nguyen whose telephone number is (571)270-5454. The examiner can normally be reached on M-F 7:30-5:00 (Alternating Friday Off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on 571-272-1114. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Vu Nguyen
Examiner
Art Unit 1796

/David Wu/
Supervisory Patent Examiner, Art Unit 1796

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